childhood lead poisoning screening guidelines

Florida Department of Health

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The Florida Department of Health releases the Childhood Lead Poisoning Screening Guidelines to county health departments to aid health care practitioners and environmental health professionals in screening children for lead poisoning and providing follow-up services, including additional blood lead tests,case management, and environmental investigation for children with elevated blood lead levels. Private physicians are encouraged to refer to this document and to contact their local county health departments and/or the Childhood Lead Poisoning Surveillance Program at (850) 245-4444, extension 2869, if they have questions or concerns about lead poisoning in their communities.

The Bureau of Environmental Epidemiology, Childhood Lead Poisoning Surveillance Program and contributors, Mr. Chris Duclos, of the Division of Environmental Health,assembled the supporting materials and created the geographic information systems maps. We acknowledge Mr. Duclos' many hours in finalizing the maps to be used for screening tools. The program and the advisory council developed the guidelines.

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We commend the council members on their contributions on behalf of Florida's children: Ralph Anderson, R.N.; Leslie Beitsch,M.D., J.D.; Anne Boone,A.R.N.P.; Hazel Brown; Charlotte Curtis,R.N.; Michelle Edouard, M.D.; Adrienne Hollis, Ph.D.; Richard Hopkins, M.D., M.S.P.H.; Richard Hunter, Ph. D.; Tammie Johnson, M.P.H.; Raul Quimbo; Louis B. St. Petery, Jr., M.D.; H. Joseph Sekerke, Ph.D.; Isabelle Stabile, M.D.,Ph.D.; Melanie Thoenes, A.R.N.P.; Charles F. Weiss, M.D.; and Robert White, Ph.D.; contributed their time and expertise in drafting the guidelines.Please see Appendix B for more information about the advisory council members.

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summary

Introduction

The Florida Childhood Lead Poisoning Surveillance Program and its advisory council developed these lead poisoning screening guidelines for release to local county health departments and private health care providers to assist in the screening, case management, and prevention of elevated blood lead levels in children. The screening guidelines are intended to increase screening of children living in high-risk communities and to decrease screening of children living in low-risk communities.

Healthy People 2010,the Nation's health plan for the next decade, includes a health objective for the complete elimination of elevated blood lead levels in children. If we are to accomplish this goal, a coordinated and concentrated screening program should be implemented in high-risk communities across Florida.

Florida's Development Pattern

Lead remains an important pediatric health problem despite the elimination of lead from gasoline and house paint. Lead-based paint hazards in older homes are the leading cause of childhood lead poisoning. In the 1997 Guidance Document, the Centers for Disease Control and Prevention (CDC) recommended a focused screening strategy based on the age of housing built before 1950. While Florida does not rank high in the nation for percentage of homes built before 1950, Florida does have a history of urban development that the Childhood Lead Poisoning Surveillance Program and the advisory council took into consideration while developing these guidelines.

Lead-based house paint may have been manufactured until it was banned in 1978. While the amount of lead in the paint decreased gradually from the 1950s through the 1970s, homes built before 1978 may have been painted with lead-based paint. For Florida, pre-1950 housing may not be the best measure of at-risk housing because there was a considerable building boom between 1950 and 1970. There were 472,481 homes built before 1950 and 1,708,205 homes, or four times as many homes, built in Florida between 1950–1970. Thus, using pre-1950 housing as a screening guideline in Florida does not capture enough of the lead poisoning risk attributable to lead-based paint.

In order to ensure that children at risk are screened in Florida, the program and council modified the CDC's strategy. In Florida, high-risk areas are: census blockgroups with ≥27% pre-1950 housing or ≥74% pre-1970 housing. Maps made using geographic information systems (GIS) technology accompany this document. The maps identify the high-risk areas, shaded in green, to assist providers in locating the blockgroups in which children most at-risk live. The zip codes on the maps will facilitate finding these blockgroups and in making the final decision to screen a child for lead poisoning. Physicians should screen children who live in these high-risk areas. Physicians should assess children living outside the high-risk areas with a questionnaire. If a capillary (fingerstick) test is used for the initial screening, a venous follow-up test should be used to confirm an elevated blood lead level within the CDC-established time frames. Please also refer to the Department of Health's Risk Assessment, Screening and Follow-Up of Children for Elevated Blood Lead Levels in the Case Management Section and the Quick References in the Appendices for follow-up time frames.

The Childhood Lead Poisoning Surveillance Program and advisory council will continue to meet to discuss the impact of the statewide guidelines on screening. These guidelines will be updated as additional information becomes available to estimate high-risk areas, including data on prevalence and incidence.

Florida Demographics

In addition to the development pattern in Florida that may be contributing to childhood lead poisoning, Florida's population matrix includes groups of children that may be at increased risk for lead poisoning. Florida currently ranks fourth nationally in total live births. In Florida there are an estimated one million children under 72 months of age, the focus population of the CDC for childhood lead poisoning. Non-whites comprise roughly 15.6 percent of Florida's population. These racial variations are important when addressing lead poisoning, as risk for environmental exposure to lead has been shown to differ significantly by race.

Florida is the resettlement site for a large number of Cuban and Haitian refugees. Local county health departments in Florida have documented elevated blood lead levels in immigrant and refugee children. These elevated blood lead levels were determined to be from exposures obtained before entering the U.S., and determined to be from imported foods and goods, folk remedies, and cottage industries based here in Florida.

Florida has a large Medicaid population, a group documented to be at-risk and under-screened for lead poisoning (GAO 1999). The Agency for Health Care Administration (AHCA) houses a Medicaid Program Development Section that oversees the operation of the Child Health Check-up, a Medicaid program requiring a blood lead test at specified ages. According to the Medicaid Program Development Section,as of February 29, 2000 there are 359,047 Medicaid-eligible children aged birth through five years in the state (AHCA, 2000). This "number of eligibles" identifies those children that are on Medicaid, that is,they have a Medicaid identification number and can receive Medicaid services.

Overview of Prevalence of Lead Poisoning In Florida

In 1993 the Florida Department of Health designed and conducted a survey to estimate the fraction of two-year-olds with blood lead levels ≥10 and ≥15 µg/dL (Hopkins et al.1995). The purpose of the survey was to determine the distribution of blood lead levels among this population and to determine the effects of various risk factors or exposures on blood lead levels. The adjusted prevalence for these two-year-olds was 4.2 percent for venous test results ≥10 µg/dL and 1.0 percent for venous test results ≥15 µg/dL. These prevalence rates are similar to those for children aged one–five in the NHANES III, Phase 2 study (US Department of Health and Human Services, 1997).

Children in certain subgroups of the Florida two-year-olds study were determined to be at increased risk for elevated blood lead levels. The weighted prevalence was higher for children of non-white mothers, for Hispanic mothers,unmarried mothers,mothers who had not finished high school,mothers who had fewer than 8 prenatal visits, children on Medicaid, children living in a home built before 1978, children having dirt yards,and children living on busy through streets.

Prevention and Elimination of Childhood Lead Poisoning

The statewide Childhood Lead Poisoning Surveillance Program, the Duval, Miami-Dade, and Pinellas County Health Department Childhood Lead Poisoning Prevention Programs, and all county health departments collaborate to increase the screening of at-risk children and to educate parents and other community partners about the prevention of lead poisoning. The Florida lead programs, and the advisory council will continue to engage parents and providers in prevention activities and monitor the impact of the screening guidelines for progress towards this health objective.

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introduction

Florida is the fourth largest state in the nation,has the nation's fourth highest live birth rate,is home to an estimated one million children less than 72 months of age, and has over 300,000 Medicaid-eligible children in the same age range. The many subtle demographic and socioeconomic differences in this pediatric population underscore the importance of addressing the preventable condition of childhood lead poisoning. The Florida Department of Health,along with the Childhood Lead Poisoning Surveillance Program (the program),its advisory council, and AHCA, remain committed to the prevention of childhood lead poisoning. This document includes lead poisoning screening guidelines and supporting materials intended to demonstrate the extent to which lead is a public health problem and to assist CHDs and private health care providers in addressing this environmental health concern.

The CDC's Lead Poisoning Prevention Branch and the national health plan, Healthy People 2010, have established the objective of eliminating elevated blood lead levels in children by the year 2010. The program is preparing to meet this challenging objective in a number of ways, including implementing a coordinated and concentrated screening program in high-risk communities across Florida.

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lead as a pediatric health problem

Despite the elimination of lead from gasoline and interior house paint in this country, lead from these sources remains in the environment and houses. The CDC has termed excessive absorption of lead as "one of the most common pediatric health problems in the United States today and it is entirely preventable," (CDC 1991). Although lead has been eliminated from house paint in this country, lead-based paint hazards in older homes remain the primary source of high-dose lead exposure for preschool-aged children (CDC 1997:13; Children's Environmental Health Network 1997:3). Houses built prior to 1978 may have lead paint on walls, floor boards, windowsills, stairs, porches,and fences.

Children are at particular risk for lead exposure due to their regular hand-to-mouth activity during daily play where lead-based paint is peeling or flaking. The dust from this deteriorating paint is easily ingested and is a significant source of exposure. Opening and closing windows, bumping furniture against walls,and scraping or sanding walls that have lead paint can leave a layer of contaminated dust. Old furniture also may have lead paint. Peeling and chipping paint from outside of homes can fall on the ground and contaminate the soil with lead. Lead from gasoline can still linger in soil near freeways and other busy streets.

Children 9 months of age to 2½ years of age are at greatest risk of lead poisoning. They have greater hand-to-mouth activity, their brains are more sensitive to the toxic effects of lead,and they absorb a greater percentage of the lead that is ingested. Their developing nerves are more susceptible because the cell membrane activity and enzymes are affected by lower levels of lead (Cassarett and Dull, 1995). Children less than 72 months of age continue to have increased risk for lead poisoning, which gradually decreases until they are 6 years of age. After 6 years of age, the risk is generally low, but special circumstances may increase risk.

Lead is not metabolized, but is directly absorbed,distributed and excreted. The rate depends on its chemical and physical form and on the physiological characteristics of the exposed person (e.g., nutritional status and age). Once in the blood,lead is distributed primarily among three compartments—blood, soft tissue (kidney, bone marrow, liver, and brain), and mineralizing tissue (bones and teeth). Absorption via the GI track following ingestion is highly dependent upon presence of levels of calcium, iron,fats and proteins (CDC, 1991).

Ingested lead is readily available to a child's body during early growth and development. Children are very different from adults physiologically. Pound for pound, young children breathe more, eat more and drink more than adults and double their weight in their first four months of life (Children's Environmental Health Network, 1997:1). For example, proportionately, an average one-year-old eats two to seven times more grapes,bananas, pears, carrots, and broccoli than an adult does. Children have greater need for calcium than do adults for developing bone and will absorb more of this element when it is ingested. If lead is ingested,the body will mistake it for calcium and absorb the lead in place of calcium. For comparison, where an adult will absorb 10 percent of ingested lead, a toddler will absorb 50 percent of ingested lead.

Effects of lead poisoning may include diminished intelligence, learning disabilities, delayed congenital development, interference with calcium metabolism, reduced heme syntheses (or the body's ability to manufacture red blood cells), reduced kidney function, and damage to the central nervous system. The damage to the central nervous system is not reversible. The extent to which these effects will present themselves in a child depends on a number of factors, including the duration and intensity of exposure. These factors are still being studied to determine long-term effects of exposure on children.

important secondary exposures for children

Though the primary exposures to lead for children are lead based paint hazards, followed by contaminated soil, there are a number of secondary exposures that can contribute to childhood lead poisoning. Though the recorded sources of exposure to lead are many, there are a small number for which CDC and state and local lead programs usually advise the public to be aware.

Improperly glazed clay pottery has been the cause of lead poisoning, where food or liquids have been stored in them. Acidic foods, including tomato paste and orange juice, considerably increase the process of lead leaching into the food. Pica,the abnormal craving for and eating of substances (e.g.: chalk, dirt, other objects) not normally eaten, has resulted in high lead levels, where pregnant women and small children have eaten pottery and other items that contained lead. In instances where county health departments have found women and children with elevated lead levels due to pica and pottery, the pottery was made in Mexico. Some imported foods and candies have also caused lead poisoning. Lead-based inks have been identified in candy wrappers and other food packaging. Lead has been included in tamarindo candy jam products made in Mexico (CDC, 1998).

Candles that have a wick with a lead core can transfer large quantities of lead in the air (Van Alphen 1999:63). The regular burning of multiple candles in small, poorly ventilated spaces could readily be associated with clinical lead poisoning (Van Alphen 1999:Abstract).

After testing and analyzing imported vinyl miniblinds, the U.S. Consumer Product Safety Commission (CPSC) has determined that some of these blinds can present a lead poisoning hazard for young children. Non-glossy, vinyl miniblinds that have lead added to stabilize the plastic in the blinds are imported each year from China, Taiwan, Mexico, and Indonesia (CPSC 1996). Vinyl miniblinds have caused lead poisoning in small children, where children handled, mouthed, or otherwise came into contact with lead dust on the blinds (Norman et al., 1997).

Imported necklaces and buttons with lead-based cores have also been culprits. County health departments have reported that children who mouthed these objects have had elevated lead levels.

Oyster shell, bonemeal and dolomite, natural sources of calcium, contain lead and calcium supplements made from these may have levels of lead that could be deleterious to health over time (Scelfo and Flegal 2000). The amount of lead varies in supplements.

Though the above exposures are important, perhaps the most significant secondary exposures are those from parents' occupations and hobbies, and from folk remedies.

Occupational and Hobby-Related Lead Poisoning in Adults and Children

While lead's affects on children are very important, adults can also suffer health consequences. Adults are exposed primarily through the workplace by inhalation of lead contaminated dust (Ellenhorn and Barceloux, 1988). Adults can be also exposed in a contaminated environment like the workplace through poor hygiene, for example, or by eating or smoking at the job site. Hobby activities can also expose adults to lead. The program encourages adults engaged in work or a hobby involving lead to be tested. *Most importantly, the program emphasizes that workers and hobbyists exposed to lead have their children tested and practice safe habits to control the lead problem.*

The frequency and severity of medical symptoms increase with the concentration of lead in the blood. Many adults with blood lead levels of 80µg/dl or greater have symptoms or signs of acute lead poisoning, although in some individuals, symptoms may be so mild that they are overlooked (National Institute of Occupational Safety and Health, 1992). Common symptoms of acute lead poisoning are loss of appetite, nausea, vomiting, stomach cramps, constipation, difficulty in sleeping, fatigue,moodiness, headache,joint or muscle aches, anemia, and

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decreased sexual drive. Severe health effects of acute lead exposure include damage to the nervous system, including wrist or foot drop, tremors, and convulsions or seizures.

Chronic lead poisoning may result after lead has accumulated in the body over time, mostly in the bone. Long after exposure has ceased, some physiological event such as illness or pregnancy may release this stored lead from the bone and produce adverse health effects such as impaired hemoglobin synthesis, alteration in the central and peripheral nervous systems, hypertension, effects on male and female reproductive systems, and damage to the developing fetus (Landrigan, 1989).

When adults are exposed to lead at work and return home at the end of the day, they may take lead dust on their bodies, clothes, tools,and vehicles and contaminate their houses and family members. This kind of exposure to lead for children is referred to as "take-home lead." See Table 1 for a list of many occupations (and hobbies) that may involve the use of lead.

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TABLE 1
occupations & hobbies that may involve exposure to lead*

- aircraft repair
- ammunition manufacture
- antique furniture refinishing
- art conservation or restoration
- asbestos removers
- automotive body or radiator repair and maintenance
- battery recycling or manufacture
- boat building, painting, repairing, maintenance
- brass or copper foundry workers
- bricklayers
- bridge, tunnel, and tower workers
- builders
- building inspectors
- cabinet makers
- cable layers
- cable repair (telephone and other lead-shielded cables)
- carpenters/joiners
- casting lead fishing sinkers, pewter toys
- ceramics
- construction
- demolition workers
- electricians
- enamelling
- excavators
- firing range staff
- glass blowing, manufacturing
- glaziers
- heating/air conditioning/ventilation maintenance/repair
- industrial machine painting or repair
- jewelry-making
- lead smelter, production, refining
- miners
- paint, pigment or shellac manufacture
- painters
- plasterers
- plastics manufacture
- plumbers/pipe fitters
- pool installers
- pottery
- printing
- recycling facility
- renovation
- roofing
- rubber manufacture
- scrap metal recovery
- stained glass making
- sign painting
- tilers
- wall paper contractors
- waterproofing specialists
- welders/metal workers

* Adult exposure to lead primarily occurs in the workplace due to inhalation of lead-contaminated dust. Parents and other adults exposed to lead through work or a hobby, and who have contact with children,should take these steps to guard against further exposing themselves and their families to lead:1) Wash hands & face before taking breaks to eat,drink,smoke or go home.2) Do not smoke,eat or drink in the work area.3) Use safe clean-up methods in the work area.4) If possible, change clothes & shower at work, or wash work clothes separately at home.5) Carefully wipe off shoes outside and leave them at the door to avoid tracking lead dust in the house.6) Regularly wipe car or truck interior with a damp cloth.

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For further information on adult occupational exposure to lead, please consult the website of the Occupational Health & Safety Administration (OSHA), the federal agency assigned to oversee occupational safety issues and compliance,at www.osha.gov, or contact one of the Florida OSHA offices:

Ft Lauderdale Area Office
8040 Peters Road, Building H-100
Ft Lauderdale,FL 33324
(954) 424-0242
(954) 424-3073 FAX

Jacksonville Area Office
Ribault Building, Suite 227
1851 Executive Center Dr.
Jacksonville,FL 32207
(904) 232-2895
(904) 232-1294 FAX

Tampa Area Office
5807 Breckenridge Parkway, Suite A
Tampa,FL 33610-4249
(813) 626-1177
(813) 626-7015 FAX

In addition to jobs, many hobbies also use lead and can accidentally expose the hobbyist and others. Lead fumes and dust can contaminate the hobby area, home, and immediate environment. The hobbyist,as well as young children playing in the hobby work area, can be at considerable risk. To prevent lead exposures,hobbyists using lead should establish a separate work area with limited access for children and pets (pets can track lead dust into the house).

A number of hobbies that can expose the hobbyist or others to lead are listed below (also see Table 1).

- Antique furniture refinishing
- Art conservation or restoration
- Automotive body or radiator repair and maintenance
- Boat building, repair and maintenance
- Casting lead fishing sinkers, pewter toys
- Ceramics or pottery
- Electronics
- Enameling
- Glass blowing
- Jewelry-making
- Making stained glass
- Shooting at indoor firing ranges
- Welding

The program encourages parents and other adults who may be exposed to lead at work or while engaged in a hobby, and who have regular contact with children, to take the following precautions to guard against further exposing themselves and those children to lead:

1. Wash hands and face before taking breaks to eat,smoke, or go home.
2. Do not smoke,eat or drink in the work area.
3. Use safe clean-up methods in the work area.
4. If possible, change clothes and shower at work.
5. Carefully wipe shoes off outside and leave them at the door to avoid tracking lead dust in the house.
6. Regularly wipe car or truck interior with a damp cloth.
7. Wash work clothing separately.

Home renovators using unsafe methods such as blowtorches, heat guns or power tools that disturb lead paint and dust, creating a lead hazard, may be at risk and may put their families, pets and neighbors at risk as well. This is particularly true in homes built prior to 1970 when older paint contained a higher lead content than current paints. If you suspect your home may have been painted with lead-based paint, have it checked for hazards.

Another adult exposure, though more unusual,is notable.A small number of older adult men living in rural areas are found with extremely elevated lead levels each year after consuming home-distilled liquor, “moonshine,” that they have processed through a car radiator (Ellis and Lacy 1998).

Folk Remedies and Other Preparations

Many non-Western folk (or herbal or home) remedies contain a high amount of lead. Medicines used to treat diarrhea or gastrointestinal symptoms, menstrual cramping, and other ailments, as well as cosmetics for decorative purposes have been found with substantial quantities of lead, often with lead as a major ingredient (CDC 1991, 1999).Please see Table 2 for a list of remedies and other preparations that have been found to contain lead.

TABLE 2 remedies & other preparations that contain lead

Name	Region of origin	Medicinal use
Albayalde or albayaidle	Mexico and Central America	Empacho (vomiting, colic), apathy and lethargy
Alarcon, azarcon Coral, luiga, maria luisa, rueda (bright orange powder)	Mexico	Empacho (see above)
Alkohl	Middle East	Topical medical preparation; applied to umbilical stump
Al Murrah	Saudi Arabia	Colic, stomach aches, diarrhea
Anzroot	Middle East	Gastroenteritis
Ba Bow Sen	China	Hyperactivity and nightmares in children
Bali goli	Asia/India	Stomach ache
Bint al dahab, bint or bent dahab	Oman, Saudi Arabia, India	Diarrhea, colic, constipation, and general neonatal use
Bokhoor (and noqd)	Saudi Arabia	Wood and lead sulfide burned on charcoal to product pleasant fumes and calm infants
Cebagin	Middle East	Teething powder
Chuifong tokuwan	Asia	?
Cordyceps	China	Herbal medicine treatment for hypertension, diabetes, bleeding
Deshi Dewa	Asia, India	Fertility pill
Farouk	Saudi Arabia	Teething powder
Ghasard (brown powder)	India	Given as a tonic
Greta (yellow powder)	Mexico	Empacho
Hai Ge Fen		
Henna	Middle East	Hair and skin dye
Herbal medicines (eg Poying Tan)	China	General
Kandu (red powder)	Asia/India	Stomach ache
Kohl, surma or Saoott	Africa, Asia, India, Pakistan, Middle East	Cosmetic; astringent for eye injuries and umbilical stump, teething powder
Kushta	India/Pakistan	Diseases of the heart, brain, liver, and stomach. Aphrodisiac, Tonic
Pay-loo-ah	Laos (Hmong)	High fever, rash
"Santrinj"	Saudi Arabia	Teething powder
Unknown (Ayurvedic)	India, Pakistan, Sri Lanka, Burma, Bhutan, Mongolia, Tibet	Metal-mineral tonic, Slows development

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florida demographics

Florida currently ranks fourth nationally in total live births. According to the Florida Department of Children and Families,the state has an estimated one million children under 72 months of age (1999). This age range is the focus population of the CDC for childhood lead poisoning. One and two year olds are also an important focus population of the CDC and of childhood lead poisoning prevention program in general. These smaller children are at greater risk for lead poisoning (see the section "Lead as a Pediatric Health Problem").

Non-whites comprise roughly 15.6 percent of Florida's population. Risk for environmental exposure to lead have been shown to differ significantly by race (Centers for Disease Control and Prevention,1997). In the program's 1999 Annual Report, the data submitted by the Department of Health, Bureau of Laboratories revealed that approximately 58 percent of venous test results of ≥10μg/dL were drawn from African-American children.

Immigrants and Refugees

In 1998 alone,18,547 arrivals, representing 43 countries, resettled in Florida (Florida Department of Health, 2000). Of those arrivals, 15,518 were from Latin America, with the majority, 14,962, arriving from Cuba. Eastern Europeans totaled 2,230 with 2,015 from Bosnia. East Asians totaled 435 with 430 individuals from Vietnam. Florida received 242 arrivals from the former Soviet Union.

New arrivals often settle in an area that reflects their ethnic and cultural backgrounds. The Florida Department of Health, Bureau of TB and Refugee Health data show that 95 percent of new arrivals pick one of the following counties as a final resettlement destination: Duval, Pinellas, Hillsborough, Broward, Miami-Dade, Orange and Palm Beach.

Florida is the resettlement site of over 80 percent of all Cuban and Haitian refugees entering the United States. According to 1990 census data, Florida ranks second in the nation for both total resettlements (231,116 persons) and refugees as a percentage of the general population (1.786 percent).

Many times the refugees bring with them children with elevated blood lead levels; ethnic practices or medicines that contribute to lead poisoning; economic disadvantages due to lack of education, skills, or language barriers; and a lack of understanding of the causes and effects of lead poisoning.

Florida's Medicaid Population

The Florida Agency for Health Care Administration (AHCA) houses a Medicaid Program Development Section that oversees the operation of the Child Health Check-up, a Medicaid program requiring blood lead testing at specified ages. According to the Medicaid Program Development Section, as of February 29, 2000 there are 359,047 Medicaid-eligible children aged birth through five years in the state (AHCA, 2000). This "number of eligibles" identifies those children that are on Medicaid, that is, they have a Medicaid identification number and can receive Medicaid services.

Children in Medicaid programs are considered by the CDC to be at increased risk for lead poisoning (CDC, 1997). Essentially, Medicaid children are at greater risk for elevated blood lead levels because they tend to live in older housing units which may increase their exposures to lead-based paint. The program works closely with the Medicaid Program Development Section to ensure Medicaid children have had their required blood lead tests and any necessary services. Staff members of the Medicaid Program Development Section and Medicaid Managed Care Section are members of the program's advisory council.

In addition to the CDC focus on Medicaid children,a report released by the U.S.General Accounting Office (GAO), reported that federal health care programs,including programs financed through Medicaid, are not effectively reaching at-risk children (GAO, 1999). From advisory council members, Ms. Anne Boone and Mr. Ralph

Anderson, the program learned that approximately one third of Florida's Medicaid children are in Medicaid health maintenance organizations (HMOs). The data are not yet available for the Florida Medicaid HMO population and were not included in the GAO report. Thus, the GAO calculation (determined from billing rates) shows that only 17 percent of Florida's Medicaid children received a blood lead test and may be an underestimation of the Medicaid children screened as a part of the Child Health Checkup Program (GAO 1999:75). The program will continue to partner with the Medicaid Program Development Section to ascertain that Child Health Check-up children are being screened for blood lead.

childhood lead poisoning in the U.S. and florida

The CDC's National Health and Nutrition Examination Surveys (NHANES) is a series of on-going national examinations of the health and nutritional status of the civilian non-institutionalized population. These surveys have been the primary source for monitoring blood lead levels in the U.S. population.A representative sample of nearly all age groups is targeted for participation in the surveys.A physical exam and interview are conducted for each participant. The exam includes a blood lead test and the survey includes questions on participation in federal health care programs, such as the Child Health Check Up and others financed under Medicaid. Data obtained in these surveys has shown that, overall, childhood blood lead levels have declined greatly in the nation.

From NHANES II, conducted 1976-1980, to Phase I of NHANES III, conducted 1988-1991, the prevalence of elevated blood lead levels decreased from 77.8 percent to 4.4 percent (U.S. Department of Health and Human Services, 1997).

For children one to five years of age, non-Hispanic Blacks or Mexican Americans from low-income families who reside in metropolitan areas (areas with ≥1 million people) or who live in older houses, showed a higher prevalence of blood lead levels ≥10μg/dL. While the decrease in the prevalence of elevated blood lead levels is encouraging, risk for lead exposure remains disproportionately high for poor, non-Hispanic Black or Mexican Americans living in older housing or in large metropolitan areas (U.S. Department of Health and Human Services,1997).

In order to get more information on the prevalence of lead poisoning in all Florida two-year-olds, a survey was conducted in 1993 (Hopkins et al, 1995). The purpose of the survey was twofold: 1. To estimate the fraction of 2-year-olds with blood lead levels ≥10 and ≥15μg/dL and determine the distribution of blood lead levels among this population; and 2. To determine the effects of various risk factors or exposures on blood lead levels.

The sampling frame included all children born to Florida residents in Florida within 21 to 27 months from the time of the survey. Birth certificate records were used to identify the sampling frame.A total of 387 children participated in the survey. The CHDs located the children, collected information from the parents or guardians, and conducted blood lead screening.

The adjusted prevalence for these two-year olds was 4.2 percent for venous test results ≥10μg/dL and 1.0 percent for venous test results ≥15μg/dL. Note that the Florida two-year-olds study resulted in similar prevalence rates to the NHANES III,Phase 2 study for children aged one to five years. NHANES reported a 4.4 percent prevalence rate for tests ≥10μg/dL for that age group. Children in certain subgroups of the Florida two-year-olds

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study were found to be at much greater risk than average. The weighted prevalence was higher for children of non-white mothers (9.4 percent versus 1.4 percent), for Hispanic mothers (7.0 versus 2.5), unmarried mothers (8.3 versus 0.8), mothers who had not finished high school (7.2 percent versus 0 percent for those with education beyond high school), mothers who had fewer than 8 prenatal visits (6.7 percent versus 2.7 percent), children on Medicaid (6.7 percent versus 0.5 percent), children living in a home built before 1978 (7.1 percent versus 0 percent for after 1978), children having dirt yards (10.7 percent versus 0 percent for grass and pavement),and children living on busy through streets (7.2 percent versus 2.3 percent for residential streets). Weighted prevalences were similar for children living in urban, rural and mixed counties.

The program does not regularly produce rates because the data submitted by private laboratories is not complete and therefore a reliable denominator is not available. Although the public laboratory does submit complete records, this subset may not be representative by which to estimate prevalence.

The program works closely with the local-level county health departments to ensure that counties have the information they need to follow-up on elevated blood lead levels in their county. All 67 local county health departments in Florida provide screening and/or educational materials in some capacity to assist parents in protecting their children from lead. Three counties have an advantage in this endeavor. The Duval and Pinellas County Health Departments have grants from the CDC for Childhood Lead Poisoning Prevention Programs, which enable them to devote more resources to prevention efforts. The Miami-Dade County Health Department was also awarded a prevention grant from the CDC in July 1999.

programs in florida dedicated to childhood lead poisoning

Lead poisoning became a notifiable disease in 1992. The current case definition of childhood lead poisoning is a venous blood sample result of ≥10 micrograms per deciliter (µg/dL) from a child less than 72 months of age. The program was established in 1992 with assistance from a grant from the CDC, and began recording data in 1993. The database is housed in the Department of Health, Bureau of Environmental Epidemiology in Tallahassee.

The program's database now contains over 300,000 records. Blood lead level results and accompanying information are routinely entered, checked for quality and merged to the main database. The state laboratory and several reporting private laboratories submit records on a weekly or monthly basis. The Florida Statutes, Chapter 381, Report of Diseases of Public Health Significance to Department,and Chapter 64D-3, of the *Florida Administrative Code,* "Control of Communicable Diseases and Conditions Which May Significantly Affect Man," address the reporting of notifiable diseases by laboratories. **Laboratories have a 72-hour time frame in which to report an elevated blood lead level with the following identifying information:**

1. Name and date of birth of the patient from whom the specimen was taken;
2. Name, address, and telephone number of the processing laboratory;
3. Diagnostic test performed, specimen type and result; and
4. Social security number.

lead guidelines

In addition,they must supply either of the following:

A. Address, telephone number, race,sex, ethnicity and social security number (pending) of the patient, or (if not available), or

B. Name, address, and telephone number of the submitting physician or health care provider.

In addition to these minimum mandatory requirements outlined in the Administrative Code,the program also requests:

1. An indication if the individual is receiving Medicaid;
2. That all blood lead test results (not only those greater than or equal to 10 micrograms per deciliter) be reported; and
3. That all reports be submitted via regular mail service on computer diskette or encrypted and emailed.

The state laboratory requires that all parties responsible for the collection of blood samples submit complete identifying information. In turn, the state laboratory provides the program with the most complete records (including Medicaid status). Some private laboratories report completely, but others do not submit records <10µg/dL or supply information essential for proper surveillance, including Medicaid status and the other variables referred to above. The program coordinator attempts to contact private laboratories to request that complete identifying information for elevated and non-elevated tests be reported to the program. Private laboratory reporting does continue to improve and remains an important source of data.

The program provides technical assistance and support for county health department surveillance and follow-up activities, including those conducted by the three county-level Childhood Lead Poisoning Prevention Programs, which are funded with CDC grants. Duval, Miami-Dade and Pinellas Counties each have prevention programs (please see the following page for a state map identifying the surveillance and prevention programs).

The Pinellas County Childhood Lead Poisoning Prevention Program was created with CDC grant funding in 1992,and the Duval County Childhood Lead Poisoning Prevention Program was created with a CDC grant in 1995. Miami-Dade County was awarded a CDC grant on July 1,1999. These three prevention programs address childhood lead poisoning in their respective counties by applying an array of prevention and intervention activities. While specific activities differ slightly in each county, all three generally provide the following services:

1. Screening of children, (focusing on ages 6 to 72 months), for lead poisoning in day care facilities and other non-medical facilities.
2. Providing case management services to families of children with elevated blood lead levels of ≥10µg/dL.
3. Providing environmental inspections of residences of children with elevated blood lead levels of ≥15µg/dL, with recommendations for remediation of lead hazards.
4. Providing environmental lead inspections of newly licensed day care facilities.
5. Family education:
   • Nutritional education
6. Education of health care providers to improve awareness about lead poisoning and screening of children at risk.
7. Facilitate screening of Medicaid-enrolled and uninsured children under 6 years of age.
8. Conduct county surveillance and maintain database

lead guidelines

childhood lead poisoning programs in florida

Statewide Childhood Lead Poisoning Surveillance Program
housed in Leon County

Childhood Lead Poisoning Prevention Programs
in Duval, Miami-Dade & Pinellas Counties

These programs are joint projects between the Florida Department of Health and the Centers for Disease Control and Prevention.

- Monitor reports of elevated blood lead levels from private laboratories and medical providers,including dates and results of follow-up lead levels and assist with the provision of additional services (eg: education, case management).
- Maintain environmental home inspection information, including the results of soil,water, dust wipes, and paint samples.
- Maintain environmental-based registry of day care centers and foster homes inspected for lead hazards.
- Data analysis: a) Providing epidemiological data on the incidence and prevalence rates of children with elevated blood lead levels and data on environmental inspections in high-risk areas, and b) Compile quarterly and annual reports, submit to CDC and to the public.

9. Provide information on lead poisoning prevention to parents, realtors, professional business groups, day care providers, community organizations, media, health professionals, health fairs/public meetings, and insurers.
10. Continual identification of unusual sources of lead poisoning.
11. Expansion of screening immigrant and refugee children.
12. Develop and improve primary prevention strategies.

Focused efforts to screen children for lead poisoning are illustrated in the table below. According to 1990 census data, Pinellas County has a population of children less than 72 months of age of approximately 62,000 (see Table 3).

TABLE 3 number of children screened in the top 7 most populous counties

FL Most Pop. Counties	Est. Pop. <72 Mo.	Rank by Pop.	Number of Children Screened 1993	1994	1995	1996	1997	1998	1999	Total
Miami-Dade	195,000	1	536	1,800	1,805	1,117	882	1,498	1,979	9,617
Broward	110,000	2	6,418	5,048	732	515	403	1,780	1,418	16,314
Hillsborough	85,000	3	3,866	3,888	2,075	1,207	1,325	2,015	1,370	15,746
Duval	76,000	4	4,872	3,190	1,881	6,389	4,714	4,594	4,786	30,426
Palm Beach	73,000	5	3,264	3,129	2,880	2,788	3,134	2,859	1,778	19,832
Orange	69,000	6	4,312	4,822	3,496	2,193	2,220	2,061	1,745	20,849
Pinellas	62,000	7	7,140	7,700	6,797	5,261	5,148	5,517	5,258	42.821
Total	670,000		30,408	29,577	19,666	19,470	17,826	20,324	18,334	155,605

Based on this number, Pinellas ranks seventh in size in Florida for the less than 72 months of age population, surpassed by Orange, Palm Beach, Duval, Hillsborough, Broward,and Miami-Dade Counties. Yet, based on screening data submitted from the state laboratory and from private laboratories, Pinellas County ranks first in the number of children screened for 1993 through 1999. Duval County closely follows Pinellas.

Miami-Dade County has the highest and most diverse population. The prevention program in Miami-Dade County has already begun to make a positive impact in screening, the second year into a three-year grant cycle. The Miami-Dade program has developed and released county screening guidelines, conducted day care inspections and blood lead screenings,and have been instrumental in the process of establishing a statewide policy for screening refugees for blood lead.

The surveillance and prevention programs are in regular communication and conduct coordinated efforts to address the problem of lead poisoning in Florida. The county prevention program coordinators are members of the program's advisory council and the surveillance coordinator frequently consults with the prevention programs to increase the quality of surveillance data and for planning and evaluation. The surveillance program is currently preparing to expand prevention activities to a statewide basis. The activities conducted and lessons learned by the three county-level prevention programs will be shared with the rest of Florida's counties.

screening guidelines

Deliberations and Findings of the Advisory Council

In developing statewide lead poisoning screening guidelines, the program and council considered a number of factors, but the cardinal decision-making issues were these:

- The primary source of pediatric lead exposure in the U.S. today is lead-based paint hazards in the home, though secondary exposures should not be discounted.
- One and two-year-old children are the most at-risk for lead poisoning due to their increased susceptibility of the developing nervous systems. They have greater hand-to-mouth activity, their brains are more sensitive to the toxic effects of lead, and they absorb a greater percentage of the lead that is ingested.
- The January 1999 GAO report found that nationwide, children on Medicaid,known to be a high-risk population for lead poisoning and required to be screened, were largely under-screened.
- There was a great overall nationwide decline, nearly 80%,in blood lead levels between the NHANES III studies, from the period 1976–1980 to the period 1988–1991 (US Department of Health and Human Services 1997).
- The CDC (1997) determined that "more effective screening is necessary and must be focused where children are most likely to benefit."

Members of the council recognized that the primary source of lead exposure is lead-based paint hazards in homes,especially the dust that results as this paint deteriorates or is otherwise distributed in the house,as with renovations. Members also discussed qualitative data submitted by CHD staff on the many other important secondary exposures,including those from parents' occupations and hobbies, imported food and goods, folk remedies and others. Members focused their attention on the prevention of lead poisoning in and screening of smaller children. However, they did note the problem of testing and following-up of older children with elevated blood lead levels and that these children may still require services to ensure the exposure is removed.

Members of the council discussed at length the lead poisoning issues related to all children, not only the most well known at-risk groups. The program and advisory council acknowledge that any child can become exposed to lead.

The program also recommends that health care providers screen children on Medicaid, immigrant and refugee children, children adopted from outside the U.S, and children in foster care. Support for these recommendations comes directly from research and from the three county-level prevention programs.

Medicaid children have been consistently documented as being at increased risk for lead poisoning. The CDC has emphasized that these children be screened (1997). The National Health and Nutritional Survey research findings have shown these children have elevated blood lead levels (United States Department of Health and Human Services 1997). The Florida Two Year Olds Study conducted by the state epidemiologist and Program staff found Medicaid children to be at increased risk (1995). These children are further documented as an under-screened population (U.S. Governmental Accounting Agency, 1999).

The program queried county health departments in response to a CDC survey on lead in immigrant and refugee children in 1998. Counties throughout Florida reported finding elevated lead levels in children who had recently relocated to the U.S. The Miami-Dade County Childhood Lead Poisoning Prevention Program conducted a study and found an 18 percent prevalence rate in a population of legal refugees entering Miami-Dade County from October 1999 through June 2000. Children adopted from outside the U.S., especially from China, have been found with elevated blood lead levels (CDC, 2000).

The program also used surveillance data to drive the decision-making process. The program expects these guidelines to assist in finding and screening at-risk children based on case information reported to the program.

lead guidelines

In 1997 Pinellas County reported 335 out of 362, or 92.54 percent of children with elevated blood lead levels ≥10µg/dL (and complete zip codes) were reported as living in the high-risk zip codes, which are layered on the GIS maps over the high-risk blockgroups. The count of elevated levels includes all test types, capillary, venous and unknown, and reflects an unduplicated count of children. In 1998 in Pinellas County 232 out of 252, or 92.06 percent of children with elevated blood lead levels ≥10µg/dL (and complete zip codes) were reported as living in the high-risk zip codes, which are layered on the GIS maps over the high-risk blockgroups.

The council and program shaped the guidelines around the above issues and age-of-housing data. The 1997 CDC guidance document contains information from which state and local public health officials may develop a statewide plan for lead screening. States were allowed flexibility in composing the most appropriate guidelines. The CDC recommended universal screening in zip codes with ≥27 percent pre-1950 housing. The CDC composed this criterion based on the fact that 27 percent of U.S. housing was built before 1950.

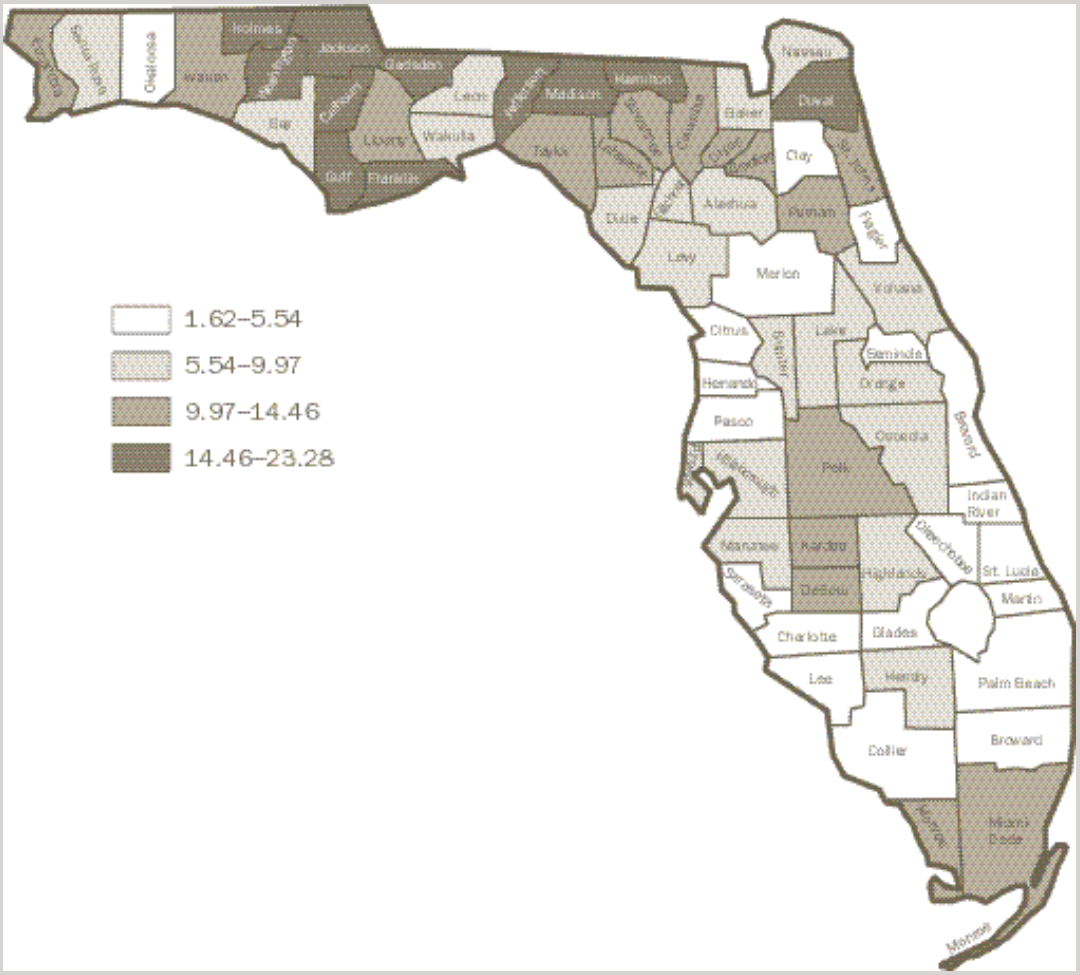
For Florida, pre-1950 housing may not be the best measure of at-risk housing because there was a considerable building boom between 1950 and 1970. There were 472,481 homes built before 1950 and 1,708,205 homes built in Florida between 1950–1970 (please see the following pages for maps of percent pre-1950 and pre-1970 housing). Although lead was gradually phased out of residential paint from the 1950s to the 1970s and was entirely banned in 1978, any house built before 1978 could contain leaded paint. Thus,using pre-1950 housing as a screening guideline in Florida does not capture enough of the lead-poisoning risk. The advisory council and program staff and contributors worked to establish high-risk criteria to find a good "fit" for Florida, based on the state's development history.

For Florida we have composed the following criteria to define a high-risk area: a census blockgroup with ≥27 percent pre-1950 housing or ≥74 percent pre-1970 housing. Please be advised that Medicaid providers should always consult their periodicity schedules to be sure they are in compliance with Medicaid regulations. Maps made using geographic information systems (GIS) technology accompany this document. The maps contain the high-risk areas, shaded in green, to assist providers in locating the blockgroups in which children live. The zip codes on the maps will facilitate finding these blockgroups and in making the final decision to screen a child for lead poisoning. Physicians should screen children who live in these high-risk areas. Physicians should assess children living outside the high-risk areas with a questionnaire. If a capillary (finger-stick) test is used for the initial screening, a venous follow-up test should be used to confirm an elevated blood lead level within the CDC-established time frames. Please also refer to the Department of Health's Risk Assessment, Screening and Follow-Up of Children for Elevated Blood Lead Levels in the Case Management Section and the Quick References in the Appendices for follow-up time frames.

These observations queried from the program's main database, combined with the advisory council's deliberations, provide a sound platform from which to launch statewide screening guidelines. As screening guidelines are used to screen children and subsequent blood lead levels with identifying information are submitted, program staff will continually evaluate the impact of these recommendations and revisit the guidelines as necessary.

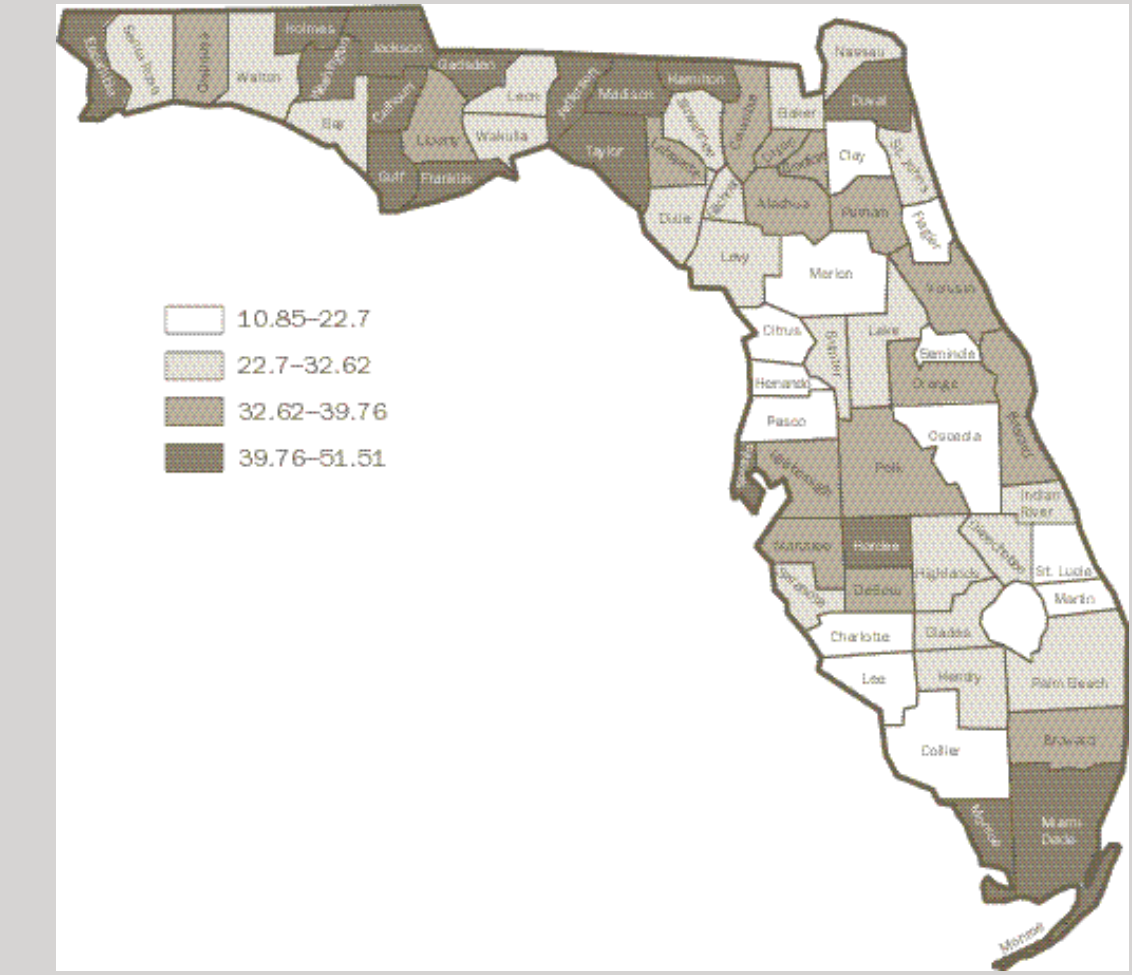
lead guidelines

percent pre-1950 housing



lead guidelines

percent pre-1970 housing



lead guidelines

case management of children with elevated blood levels

All children with elevated blood lead levels should have a complete clinical evaluation and follow-up testing. Please see the following case management guidelines developed by the Florida Department of Health, Bureau of Family Health Services. These case management guidelines are also included in the county health department policy book.

risk assessment, screening & follow-up of children for elevated blood lead levels

I. Title: Risk Assessment,Screening and Follow-up of Children for Elevated Blood Lead Levels.

II. Type of Standard: Service

III. Outcome: Children at risk for elevated blood lead levels will be screened to provide early intervention intended to prevent long-term, physical, emotional and developmental damage. The Florida Childhood Lead Poisoning Surveillance Program and Advisory Council recommend that children living in a high-risk area should be screened for lead poisoning at 1 and 2 years of age. Older children, up to age 6,living in these areas, who were not screened by age 2, should also be screened. Children living outside the high-risk areas should be assessed for risk with a lead poisoning risk questionnaire,and screened if determined to be at risk.A high-risk area is defined as a census blockgroup with ≥27% pre-1950 housing or ≥ 74% pre-1970 housing as documented on geographic information maps. In the event a healthcare provider decides to screen a child older than age 6 for elevated blood lead levels, the risk assessment, screening and follow-up remains the same as for children under the age of 6. Any immigrant, refugee, foster care children and children adopted from outside the United States should be screened for lead poisoning. In addition, children covered by Medicaid are required to be screened according to Medicaid's Child Health Check-Up policy. Since blood lead levels of 10µg/dL or greater are a reportable condition in Florida, referrals for children needing follow-up will come from outside the county health department (CHD),as well as from the CHD clinic population. Each CHD will have a specified contact person responsible to ensure follow-up of blood lead levels of 10µg/dL or greater.

IV. Personnel: M.D., D.O.,A.R.N.P., P.A.,R.N., R.D., L.D., L.P.N., Health Educator, Family Support Worker, Environmental Health Specialist,and Aide/Technician within the constraints of their individual practice acts and protocols.

1. Subjective and objective data gathering: M.D., D.O.,A.R.N.P., P.A., R.N., R.D., L.D., L.P.N., Environmental Health Specialist, Aide/Tech, FSW
2. Assess and evaluate: M.D., D.O.,A.R.N.P., P.A.,R.N., R.D., L.D., Environmental Health Specialist
3. Planning/ Education/ Counseling: M.D., D.O.,A.R.N.P., P.A., R.N.,L.P.N., R.D., L.D., Environmental Health Specialist, Health Educator, FSW
4. Intervention: M.D., D.O.,A.R.N.P., P.A.,R.N., L.P.N., R.D.,L.D., Environmental Health Specialist, FSW

5. Evaluation: M.D., D.O.,A.R.N.P., P.A.,R.N., R.D., L.D., Environmental Health Specialist
6. Emergency: M.D., D.O.,A.R.N.P., P.A., R.N.
7. Documentation: M.D., D.O.,A.R.N.P., P.A., R.N., L.P.N.,R.D., L.D.,Environmental Health Specialist, Health Educator, FSW, Aide/Tech

V. Competencies: Health care providers should have the following knowledge,skills, and abilities appropriate to their professional practice acts and protocols. They must demonstrate knowledge of pediatric blood screening tests, pediatric blood sampling techniques, and the responsibilities related to obtaining, storing and shipping blood specimens. They should demonstrate skill in subjective data collection, in pediatric physical assessment and knowledge of the symptoms of blood lead toxicity. They should demonstrate knowledge of environmental assessment and hazard reduction, and nutrition assessment and therapy. Their training should include both a didactic and a practice component covering pediatric physical and nutritional assessment and evaluation,heavy metal toxicology and its complications, clinical studies, counseling, environmental assessment and case management.

VI. Areas of Responsibility:

A. Subjective Data:

1. Review the geographic information maps,and complete the lead poisoning risk assessment form as indicated. Determine if the child is at risk for lead poisoning and screen accordingly. Obtain a client history from a reliable source and update this history at subsequent visits. Include questions about lead exposure risk factors, signs and symptoms of possible lead toxicity, and nutritional habits of the child. Include the following :
    a. Obtain information about the child's home environment, including that of any regular babysitter, daycare, school, relative or friend's home, where a child may be exposed to environmental lead. Obtain information about toys, cribs, or any other objects that the child may chew or suck that could contain lead or be contaminated with dust containing lead. Potential lead sources are imported vinyl window blinds, flaking lead-based paint (lead paint was sold for household use until 1978 in Florida),and dirt or sand in a yard that may have been contaminated with leaded gasoline. Other sources are leaching from old batteries, lead pipes or lead solder joints. Old paint chips, even though not visible to the naked eye, can sometimes be found in the dirt around old houses and farm buildings. Deposits from leaded gasoline can be found along roads and highways.
    b. Obtain description of previous housing history.
    c. Obtain a description of child's diet including pica, herbal teas, and imported spices and candies. Include questions about the type of utensils the family uses for preparing, serving and storage of food. Imported, antique or hand-made pottery items may contain lead-based glazes. Old pewter dishes or cups that contain lead may be used to hold baby's food or liquids for heating or feeding.
    d. Obtain medication history. Include questions about over-the-counter drugs, folk tonics and remedies that may contain lead (or other toxic metal compounds). Certain cosmetics manufactured outside the United States may also contain lead.
    e. Ask appropriate questions to identify if the child has a mother, sibling, or playmate who has, or did have,lead poisoning.

f. Information about the family hobbies and employment environment(s) should be obtained. Making stained glass either as a hobby or as employment is a possible source of lead contamination,as is melting lead for molding bullets,fishing line weights, dive weights, etc. Bridge painters, house painters and restorers who work on houses painted or built prior to 1978 may bring lead dust into the home on work clothing.

B. Objective Data:

1. Repeated tests and periodicity of testing according to the November 1997 CDC guidelines and/or symptoms of elevated blood lead levels. Some symptoms of lead poisoning are neurological abnormalities,abdominal pain, developmental delay, attention deficit, behavior disorders, hearing loss or anemia. If the patient is on Medicaid, then blood lead screening is done according to Medicaid policy.
    a. If the reported blood lead level greater than 10µg/dL was from a capillary blood sample, a venous sample should be drawn to confirm a diagnosis of blood lead level toxicity. If this diagnostic test is not performed within 6 months of the capillary blood-screening test, the next test is then still considered a screening test. Decisions about follow-up testing should be made on the basis of the new test, and not on the basis of the original screening test. Interventions need to be based on the results of diagnostic testing.
    b. If the capillary blood lead level result is 10-19µg/dL, a diagnostic test should be performed on a venous blood sample within 3 months.
    c. If the capillary blood lead level result is 20-44µg/dL, a diagnostic test should be performed on a venous blood sample within 1 week to 1 month (the higher the screening blood lead level,the more urgent the need for a diagnostic test).
    d. If the capillary blood lead level result is 45-59µg/dL, a diagnostic test should be performed on a venous blood sample within 48 hours.
    e. If the capillary blood lead level result is 60-69µg/dL, a diagnostic test should be performed on a venous blood sample within 24 hours.
    f. If the capillary blood lead level result is ≥ 70µg/dL, a diagnostic test should be performed on a venous blood sample immediately as an emergency lab test.
    g. The Blood Lead Screening component of the County Health Department Clinic Management System is available as a tool to assist county health department staff to track scheduled services based on a client's confirmed lead level.

C. Assessment and Treatment

1. If the diagnostic venous blood sample result is less than 10µg/dL, then the child should be re-tested in one year. Retest in 6 months if the child is high risk. Parents should receive education and counseling about the causes and effects of elevated lead levels and the preventative measures to diminish lead exposure.
2. If the diagnostic venous blood sample result is 10-14µg/dL,the test should be repeated within 3 months. Parents should receive education and counseling about the causes and effects of elevated lead levels and the preventative measures to diminish lead exposure.

3. If the diagnostic venous blood sample result is 15-19μg/dL,the test should be repeated within 2 months. Parents should receive education and counseling about the causes and effects of elevated lead levels and the preventative measures to diminish lead exposure.
4. If the diagnostic venous blood sample result is ≥20μg/dL, or if the child has had two or more venous blood lead levels of 15-19μg/dL at least 3 months apart, this child should be referred for medical evaluation.CMS will provide direct medical and nursing case management for children with blood lead levels of ≥20μg/dL if the referred child meets CMS financial eligibility requirements. Environmental assessment of the child's home should be carried out; and if history warrants it,other areas of the child's normal daily environment, such as baby sitter's home or day care premises,should be evaluated for sources of lead exposure.
5. Children receiving medical evaluation should have follow-up blood level testing, in addition to other interventions, at 1-2 month intervals until each of the following conditions is met:
    a. The blood lead level has remained <15μg/dL for at least 6 months.
    b. Lead hazards have been removed from the child's environment and there are no new exposures.
6. When these conditions have been met, the child should be tested approximately every 3 months, up to the age of 36 months. Further follow-up testing is not needed after 36 months if the child has met the above criteria.
7. Refer and collaborate with Environmental Health for home assessment and hazard reduction of environmental lead exposure sources.

D. Education/Counseling

1. Teach parents/guardian that young children are susceptible to childhood lead poisoning due to their normal hand-to-mouth activity, and that often lead-poisoned children have no symptoms. Most cases are diagnosed and treated through appropriate screening. Anticipatory guidance should be provided prenatally, and again at the 3–12 month well-child visits.
2. Teach parents/guardians that lead is harmful to the child's developing brain and nervous system. Potential sources of lead exposure are deteriorated lead-based paint, lead contaminated soil, parental hobbies or occupations involved with lead materials,imported or antique dishes, traditional medicines, food in imported metal-seamed cans, and drinking water.
3. Counsel parents/guardian that lead-based paint is the most common lead hazard for preschool children. Commonly, children ingest dust contaminated with lead from deteriorating lead-based paint disturbed during home renovations, or released from lead-painted friction surfaces (such as windows).
4. Inform parents/guardian of the various methods available to reduce lead exposure.
    a. Minimize house dust by damp mopping and damp-wiping floors and other surfaces in the home.
    b. Wash children's hands frequently, especially prior to meals and bedtime. Wash toys and pacifiers often.
    c. Importance of regular meals rich in calcium, vitamin C, iron, and lower in fat (fat restriction for children age 2 and older), to reduce the potential gastrointestinal absorption of lead.
    d. Use cold tap water for preparing and cooking all food. If the tap water has not been

used for 6–8 hours, run the water for a couple of minutes before using the water for food preparation or drinking.

e. Hazards of the improper removal of lead-based paint.

f. When preparing infant formula, use cold tap water as described in (d.) above. If boiling the water, do not boil for more than 1 minute. Excessive boiling of water can increase the concentration of lead that may be present in the water.

5. Refer child less than 5 years of age to the WIC Program for eligibility determination.

VII.Documentation

1. Document all appropriate information as addressed under the previous section of this protocol "VI. Areas of Responsibility" on the appropriate state forms:

a. Child Health History: DOH-H 3105B

b. Child Health Physical Examination: DOH-H 3105A

c. Problem List: DOH-H 3115

d. Progress Note: DOH-H 3056

VII. Supportive Data

Guidelines Clinical Preventive Services, 2nd Edition. Report of the U.S. Preventive Services Task Force. Williams & Wilkins, 1996.

Centers for Disease Control and Prevention.Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials. Atlanta: CDC, 1997.

lead guidelines

using a verbal lead poisoning risk assessment questionnaire

The Florida Department of Health recommends that providers use a risk assessment tool in addition to the GIS maps to make the final decision (if there is any question) to screen a child for lead poisoning. The risk questionnaire continues to be valuable in determining a child's individual risk. Several studies have found a positive association between increased risk for elevated blood lead levels and a positive answer to either of the two questions: 1) Does your child live in or regularly visit a house that was built before 1950; 2) Does your child live in or regularly visit a house built before 1978 with recent or ongoing renovations or remodeling (within the last 6 months)? These two questions are recommended by the CDC as part of a basic risk questionnaire. The program and advisory council have altered the first question to read:"1) Does your child live in or regularly visit a house that was built before 1978?" to better fit with the history of Florida's urban development.

The use of a verbal risk assessment tool was a source of debate and discussion throughout the meetings of the advisory council. Some council members stated that the tool was not necessary, because children at-risk for poisoning were being either required by Medicaid, or recommended by the program to be screened. Thus,there would be a documented lead result for the children and the questionnaire would not be needed to determine if the child was at-risk. Other council members, including those associated with county-level Childhood Lead Poisoning Prevention Programs, wished to maintain the questionnaire in a recommended status because they have documented cases of lead poisoning where the questionnaire proved helpful in the decision to screen the children.

The Florida Department of Health agrees with the majority of council members who wanted to recommend the screening questionnaire. For an example of a thorough questionnaire, please see the following Risk Assessment developed by the Florida Department of Health, Bureau of Family Health Services.

lead poisoning risk assessment

Date					
Does your child live in or regularly visit (once a week or more) any house or building built before 1978?					
Does your child live in or regularly visit any house or building that has vinyl miniblinds, lead pipes, pipes with lead solder joints, or had metal pipes replaced or repaired within the last five years?					
Does your child have a mother, sibling or playmate who has or did have lead poisoning?					
Does your child frequently come into contact with an adult whose job or hobby involves exposure to lead? Some examples are employment in building renovation, an auto battery factory, auto or radiator repair shop, highway bridge sandblasting or painting, welding metal structures, wire cable cutting or hobbies such as refinishing furniture, casting bullets, making stained glass, toy soldiers, dive weights, or fishing weights?					
Does your child eat food that had been stored in metal cans, from leaded crystal, ceramic, or pewter dishes, or have contact with cosmetics, candies, spices, and home or folk remedies not made or sold in the United States? Have you ever seen your child eat dirt or paint chips?					
Does your child play in loose soil, near a busy road or near any industrial sites such as battery recycling plant, junk yard or lead smelter?					
Has your child lived in a foster care home or in a country other than the United States?					
Place date at the top of the column. Indicate response by "Y" for yes, "N" for no, or "U" for unknown in the appropriate blocks. Sign name and title at the bottom of appropriate column. **A yes or unknown response to any question indicates the child is at risk for lead poisoning. The child should receive blood lead testing and appropriate follow-up. See Risk Assessment, Screening and Follow-up of Children for Elevated Blood Lead Levels.**	Signature/Title	Signature/Title	Signature/Title	Signature/Title	Signature/Title

Name:
ID No:
Date of Birth:

lead guidelines

references cited

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2000 Number of Medicaid Eligibles by Age and County as of February 29, 2000. Electronic Document.

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1998 China Will Ban Leaded Gasoline Production. Journal of Commerce.

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appendix A

Quick References

Lead Poisoning Risk Assessment
Screening Guidelines
Follow-up Screening and Activities for Initial Elevated Capillary tests
Diagnostic And Follow-Up Activities For Confirmed Venous Blood Lead Levels ≥10µg/dL
Follow-Up Screening and Activities For Confirmed Venous Blood Lead Levels ≥45µg/dL
Remedies and Other Preparations that Contain Lead
Occupations and Hobbies that May Involve Exposure to Lead

lead poisoning risk assessment

Date					
Does your child live in or regularly visit (once a week or more) any house or building built before 1978?					
Does your child live in or regularly visit any house or building that has vinyl miniblinds, lead pipes, pipes with lead solder joints, or had metal pipes replaced or repaired within the last five years?					
Does your child have a mother, sibling or playmate who has or did have lead poisoning?					
Does your child frequently come into contact with an adult whose job or hobby involves exposure to lead? Some examples are employment in building renovation, an auto battery factory, auto or radiator repair shop, highway bridge sandblasting or painting, welding metal structures, wire cable cutting or hobbies such as refinishing furniture, casting bullets, making stained glass, toy soldiers, dive weights, or fishing weights?					
Does your child eat food that had been stored in metal cans, from leaded crystal, ceramic, or pewter dishes, or have contact with cosmetics, candies, spices, and home or folk remedies not made or sold in the United States? Have you ever seen your child eat dirt or paint chips?					
Does your child play in loose soil, near a busy road or near any industrial sites such as battery recycling plant, junk yard or lead smelter?					
Has your child lived in a foster care home or in a country other than the United States?					
Place date at the top of the column. Indicate response by "Y" for yes, "N" for no, or "U" for unknown in the appropriate blocks. Sign name and title at the bottom of appropriate column. **A yes or unknown response to any question indicates the child is at risk for lead poisoning. The child should receive blood lead testing and appropriate follow-up. See Risk Assessment, Screening and Follow-up of Children for Elevated Blood Lead Levels.**	Signature/Title	Signature/Title	Signature/Title	Signature/Title	Signature/Title

Name:
ID No:
Date of Birth:

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childhood lead poisoning screening in florida—quick reference

Screen:

Children <72 months of age living in high-risk zip codes. A high-risk area is defined as a census blockgroup with ≥27% pre-1950 housing or ≥ 74% pre-1970 housing. Consult Florida Department of Health geographic information maps for high-risk areas and the associated zip codes.

Older children, up to age 6, living in these areas, who do not have a documented blood lead level by age 2, should also be screened.

Children not living in high-risk zip codes should be verbally assessed with a questionnaire that has a minimum of the following three questions:

1. Does your child live in or regularly visit a house that was built before 1970?
2. Does your child live in or regularly visit a house built before 1978 with recent or ongoing renovations or remodeling (within the last 6 months)?
3. Does your child have a sibling or playmate who has or did have lead poisoning?

Providers are encouraged to supplement these three questions with questions related to parental occupations/hobbies, use of imported foods and spices, home remedies, and questions on specific risks that may be present in their communities (eg: residence in close proximity battery recycling plant). If there is a positive answer to any one of the questions, the child should be screened.

Providers are encouraged to use the Department of Health's Lead Poisoning Risk Assessment.

Children found to have an initial capillary blood lead level of ≥10 micrograms per deciliter (µg/dL) should have a venous confirmation test.

The following children (at least those <72 months of age) should also be screened:

- Children on Medicaid (see periodicity schedule)
- Immigrant and Refugee Children
- Children adopted from outside the U.S.[1]
- Children in Foster Care

[1] Practitioners are reminded that lead may still used in paint,gasoline or other products in many countries and that screening these children is a precaution.

diagnostic and follow-up guidelines for initial elevated capillary blood lead levels ≥10µg/dL found in children <72 months of age—quick reference

Venous Diagnostic Testing is Required to confirm capillary screening results of ≥10µg/dL. The following table should be used to determine the time frame for performing the venous test and intervention measures needed.

Capillary Screening Test Results	Confirm With Venous Blood Test Within	Recommended Actions
10-19 µg/dL	1–3 Months* If the confirmation test is not performed within 6 months of the capillary, the next test is still considered a screening test	• Mail notice letter to parent,stress need for follow-up and include follow-up appointment date in letter • Provide health education including: household cleaning tips, handwashing, nutrition, and information on identifying possible sources of lead. • Assess for anemia • Obtain environmental history for sources of lead exposure • Provide information to reduce lead exposure
20-44 µg/dL	1 Week–1 Month*	• Provide health information and case management as listed above • Screen siblings and household contacts under 6 years
45-59 µg/dL	48 Hours	• Provide health education, case management, and environmental action as listed above • Screen siblings and household contacts under 6 years • Determine if child is symptomatic for lead poisoning, and if symptomatic and lead-risks are present,medical intervention and treatment should be considered
60-69 µg/dL	24 Hours	• Provide health education, case management, and environmental action as listed above • Determine if child is symptomatic for lead poisoning, and if lead risk are present,medical intervention and treatment should be considered
≥ 70 µg/dL	Immediate as an Emergency Lab Test	• Follow recommendations for Class IV venous result • Conduct elevated blood lead level investigation of primary/secondary residence and/or day care • Initiate chelation therapy, hospitalize if appropriate **Note: Chelation therapy should not be postponed while awaiting results of a repeat test when the capillary blood lead level is ≥70µg/dL or clinical symptoms are present** **Post-Chelation Guidelines:** • Repeat venous lead level in 1–3 weeks after hospital discharge • Repeat venous lead level every two weeks for 6–8 weeks • Monitor lead level closely for 4–6 months after chelation: If the lead level "rebounds" to pre-treatment levels, repeat chelation therapy may be needed. Minimum of two week intervals needed between chelation courses.

*The higher the blood lead level, the more urgent the need for a venous follow-up test. Physicians: Please report all elevated venous levels to your local county health department.

diagnostic and follow-up activities for confirmed venous blood levels ≥10µg/dL found in children <72 months of age—quick reference

Children should receive follow-up services according to the results of the diagnostic (venous) blood lead test.

Venous Test Results	Follow-up Venous Testing Schedule	Recommended Actions
Class I 0-9 µg/dL	Normal, re-test in one year	Yearly health education and risk assessment for children under 6 years. Re-test in 6 months if child is high-risk.
Class IIA 10-14 µg/dL	Within 3 months	· Mail notice letters to parent, stress need for follow-up, and include follow-up appointment date in letter · Obtain environmental history for sources of lead · Provide health education: household cleaning tips, lead prevention guidance,nutritional information, and hazard reduction education to reduce exposure
Class IIB 15-19 µg/dL	Retest within 2 months of initial confirmation. If this is a follow-up test, retest every 3–4 months	· Notify parents as above · Provide health education, nutritional counseling and case management as listed above · Consider elevated blood lead level investigation of primary/secondary residence and/or day care · Screen siblings and household contacts under 6 years
If the diagnostic venous blood sample result is ≥20µg/dL, or if the child has had two or more venous blood lead levels of 15–19µg/dL at least 3 months apart, this child should be referred for medical evaluation to the Department of Health's Bureau of Childrens' Medical Services (CMS). CMS will provide direct medical and nursing case management for children with blood lead levels of ≥20µg/dL if the referred child meets CMS financial eligibility requirements. Environmental assessment of the child's home should be carried out; and if history warrants it,other areas of the child's normal daily environment, such as baby sitter's home or day care premises, should be evaluated for sources of lead exposure. If the child does not meet eligibility requirement, see recommended activities below.		
Class III 20-44 µg/dL to	Retest in 1 month of initial confirmation. If this is a follow-up test, retest every 1–2 months	· Notify parents as outlined in Class IIB above · Obtain environmental history for sources of lead · Provide nutritional,educational, and hazard information as listed above · Conduct elevated blood lead level investigation of primary/secondary residence and/or day care · Screen siblings and household contact under 6 years · Complete medical evaluation and history: Physical examination · Assess for anemia and recommend multi-vitamins with Fe or iron treatment as indicated. Consider Ferritin level if no response to iron treatment · Assess for development delays • **Consider Succimer treatment at 38-44µg/dL** • If two sequential venous,results taken approximately 1 month apart, are 38–44, chelation may be necessary stimulate release of lead from bone.

Physicians: Please report all elevated venous levels to your local county health department.

diagnostic and follow-up activities for confirmed venous blood levels ≥45µg/dL found in children <72 months of age—quick reference

Children should receive follow-up services according to the results of the diagnostic (venous) blood lead test. These extremely elevated venous test results warrant special and immediate attention.

Venous Test Results	Follow-up Venous Testing Schedule	Recommended Actions
Class IV 45-69µg/dL	**Urgent Treatment** Repeat within 48 hours of initial confirmation. If this is a follow-up test, retest every 2 weeks until level declines	• Contact family and stress need for follow-up • Obtain environmental history for sources of exposure • Provide health education including: household cleaning tips, hand washing, nutrition, and hazard reduction education • Conduct elevated blood lead level investigation of primary/secondary residence and/or day care • Screen siblings and household contacts under 6 years • Provide Medical Intervention • Assess for lead poisoning symptoms • Assess for anemia and initiate iron treatment • Repeat venous lead level before initiating oral chelation therapy (succimer) or intravenous inpatient treatment
Class V ≥70µg/dL	**Medical Emergency** Repeat Venous as an emergency lab test prior to initiating chelation therapy	• Follow recommendations for Class IV above • Conduct elevated blood lead level investigation of primary/secondary residence and/or day care • Hospitalize and initiate chelation therapy **Note: Chelation therapy should not be postponed while awaiting results of a repeat test when the venous blood lead level is ≥70µg/dL or clinical symptoms are present** **Post-Chelation Guidelines:** • Repeat venous lead level in 1–3 weeks after hospital discharge • Repeat venous lead level every two weeks for 6–8 weeks • Monitor lead level closely for 4–6 months after chelation: If the lead level "rebounds" to pre-treatment levels, repeat chelation therapy may be needed. Minimum of two week intervals needed between chelation courses.

Physicians: Please report all elevated venous levels to your local county health department.

lead guidelines

remedies & other preparations that contain lead—quick reference

Name	Region of origin	Medicinal use
Albayalde or albayaidle	Mexico and Central America	Empacho (vomiting, colic), apathy and lethargy
Alarcon, azarcon Coral, luiga, maria luisa, rueda (bright orange powder)	Mexico	Empacho (see above)
Alkohl	Middle East	Topical medical preparation; applied to umbilical stump
Al Murrah	Saudi Arabia	Colic, stomach aches, diarrhea
Anzroot	Middle East	Gastroenteritis
Ba Bow Sen	China	Hyperactivity and nightmares in children
Bali goli	Asia/India	Stomach ache
Bint al dahab, bint or bent dahab	Oman, Saudi Arabia, India	Diarrhea, colic, constipation, and general neonatal use
Bokhoor (and noqd)	Saudi Arabia	Wood and lead sulfide burned on charcoal to product pleasant fumes and calm infants
Cebagin	Middle East	Teething powder
Chuifong tokuwan	Asia	?
Cordyceps	China	Herbal medicine treatment for hypertension, diabetes, bleeding
Deshi Dewa	Asia, India	Fertility pill
Farouk	Saudi Arabia	Teething powder
Ghasard (brown powder)	India	Given as a tonic
Greta (yellow powder)	Mexico	Empacho
Hai Ge Fen		
Henna	Middle East	Hair and skin dye
Herbal medicines (eg Poying Tan)	China	General
Kandu (red powder)	Asia/India	Stomach ache
Kohl, surma or Saoott	Africa, Asia, India, Pakistan, Middle East	Cosmetic; astringent for eye injuries and umbilical stump, teething powder
Kushta	India/Pakistan	Diseases of the heart, brain, liver, and stomach. Aphrodisiac, Tonic
Pay-loo-ah	Laos (Hmong)	High fever, rash
“Santrinj”	Saudi Arabia	Teething powder
Unknown (Ayurvedic)	India, Pakistan, Sri Lanka, Burma, Bhutan, Mongolia, Tibet	Metal-mineral tonic, Slows development

lead guidelines

occupations & hobbies that may involve exposure to lead quick reference

- aircraft repair
- ammunition manufacture
- antique furniture refinishing
- art conservation or restoration
- asbestos removers
- automotive body or radiator repair and maintenance
- battery recycling or manufacture
- boat building, painting, repairing, maintenance
- brass or copper foundry workers
- bricklayers
- bridge, tunnel, and tower workers
- builders
- building inspectors
- cabinet makers
- cable layers
- cable repair (telephone and other lead-shielded cables)
- carpenters/joiners
- casting lead fishing sinkers, pewter toys
- ceramics
- construction
- demolition workers
- electricians
- enamelling
- excavators
- firing range staff
- glass blowing, manufacturing
- glaziers
- heating/air conditioning/ventilation maintenance/repair
- industrial machine painting or repair
- jewelry-making
- lead smelter, production, refining
- miners
- paint, pigment or shellac manufacture
- painters
- plasterers
- plastics manufacture
- plumbers/pipe fitters
- pool installers
- pottery
- printing
- recycling facility
- renovation
- roofing
- rubber manufacture
- scrap metal recovery
- stained glass making
- sign painting
- tilers
- wall paper contractors
- waterproofing specialists
- welders/metal workers

appendix B

Childhood Lead Poisoning Surveillance Program
Advisory Council Members

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childhood lead poisoning surveillance program advisory council members

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appendix C

Background on the GIS Mapping Project for the Advisory Council

For use in clinics as a screening tool, the council approved maps using the geographic information systems (GIS) concept to assist health care providers in making the decision to screen a child for lead poisoning (please see maps accompanying this document). On the maps,it is explained that the shaded areas are those that exceed the national average for pre-1950 or pre-1970 housing. Children aged 1 and 2 years living in the shaded areas should be screened. Older children living in these areas who were not screened by age 2 should also be screened.

We conducted a mapping project using GIS to develop guidelines to aid focused screening efforts at the county level. For this project, the location of children with elevated lead levels was analyzed in conjunction with 1990 census data on age of housing because deteriorating lead-based paint in older housing is the primary avenue for exposure in young children. In comparison to the nation, Florida's housing does not appear to be as hazardous to young children. Only 7.7 percent of Florida's housing was built before 1950. This percentage represents 472,481 homes, which places Florida 19th out of 50 states. As indicated above, there was a large building boom in this state between 1950 and 1970. In Florida, 65 percent or 3,967,173 homes were built before 1980. Nationally, Florida ranks much higher with pre-1980 housing than with pre-1950 housing.

This GIS project used pre-1970 housing to define areas of older housing in Florida with the same rationale as the CDC recommendation. At the national level, 58 percent of all homes were built before 1970. We chose a more restrictive percentage,74 percent,and anticipate this will result in more screening of the children who are at highest risk. In our modified definition, we have mirrored the CDC's definition, but expanded it to include pre-1970 housing because of the WWII housing boom in Florida. The definition of a high-risk area is: A census blockgroup with ≥27 percent pre-1950 housing or ≥74 percent pre-1970 housing. In practice,this definition requires mandatory screening in areas that exceed the national percentage for pre-1950 or pre-1970 housing. A census blockgroup is the smallest unit, for which complete data is available,that is used by the U.S. Census bureau to assess population. It is designed to enumerate approximately 1,700 people. For each county in Florida, these high-risk blockgroups were placed into a selected subset. Next,it was determined which zip codes contained this subset of blockgroups. Zip codes were placed on the maps to assist in determining if a child lives in a high-risk area.

This definition was proposed to and accepted by council members. The council members and the Childhood Lead Poisoning Surveillance Program will evaluate and revisit the guidelines as they are distributed for use throughout the state and providers begin to give feedback.

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